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married per 1,000 of the population at all ages; the number of births was 881,241, being in the proportion of 24.4 per 1,000 of the population, and the deaths numbered 527,864, or 14.6 per 1,000 of the population. The marriage rate was 0.2 per 1,000 above that in the previous year, but 0.3 below the average rate for the ten years 1901-10. The highest rate in any registration county with a population exceeding 100,000 was 17.8 in London, and the lowest rate was 11.5 in Herefordshire. A decline of 0.7 per 1,000 is recorded in the birth-rate when compared with that for 1910, which was the lowest recorded till then; and last year's rate was 2.8 per 1,000 below the average for the preceding ten years. Among the registration counties Durham had the highest birth-rate, 31.1, and Sussex, with 18.2, was at the other end of the scale. The death-rate was 1.1 per 1,000 above that in 1910, the lowest yet recorded, but was 0.8 below the average for the preceding ten years. The highest rate was 16.8 in Lancashire and the lowest was 11.4 in Middlesex. Of the deaths registered 114,798 were those of infants under one year, 263,481 those of persons between one year and 65 years of age, and 149,585 those of persons aged 65 years and upwards. Infantile mortality, measured by the proportion of deaths under one year of age to registered births, was 130 per 1,000, or 25 per 1,000 above the rate in 1910, and three above the ten years' average. In London the marriages during 1911 numbered 40,201, corresponding to a rate of 17.8 per 1,000 of the estimated population, an increase of 0.5 upon the rate in 1910 and of 0.4 upon the average rate for the five years 1906-10. After distributing the births in the chief institutions receiving maternity cases, the birth-rate in London was 24.8 per 1,000 of the population. This is the lowest rate recorded in the metropolis since civil registration was established. In 1867 the birth-rate in London attained the highest point on record, viz., 36.5 per 1,000 living; since that date the ratio has, with trifling exceptions, fallen steadily. Last year's rate of 24.8 was 0.7 below that in 1910, and no less than 2.7 below the average rate for the ten years 1901-10. The effect of the fall

in the birth-rate in London is that, notwithstanding the great decline in the death-rate which has occurred since 1876-80, the natural increase of population by excess of births over deaths, which was then 13.38 per 1,000 living, has now fallen to 9.74. The death-rate in London last year was 15.0 per 1,000, or 1.3 above that in the previous year, and 0.1 above the average for the five years 1906-10. Since the beginning of this century the rate of infantile mortality in London has, with fluctuations, shown a considerable decline. It reached its lowest point, 103 per 1,000 births in 1910, and rose to 129 last year.

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#### UNIVERSITY AND EDUCATIONAL NEWS

WORK has begun on the new graduate school at the University of Pennsylvania, which is to cost \$500,000. Money for the school was willed by Colonel James M. Bennett in 1889. There will be dormitories for women as well as men.

FIFTY years after the founding of the School of Mines at Columbia University, or in September, 1914, the Schools of Engineering, its successor, will enter upon a new era and engineering will be placed on the same university plane as law and medicine. Beginning with the academic year of 1914-15 the engineering courses at the university will be composed of three years of undergraduate work, leading up to the degree of bachelor of science; and three years of postgraduate work, leading to the engineering degrees. In order to make adequate provision within the university for students who desire to prepare themselves in three years of college residence for the new courses, a program has been prepared leading to the degree of B.S. The first and practically all the second year will be offered in the present academic year of 1912-13, and the third year may be followed substantially, although modifications may be necessary to avoid conflict with the present courses for candidates for degrees under the old basis, and special programs will be arranged in case of conflict, so that students who desire to begin the new six years course may do so at

once without waiting for the full plan to go into effect in 1914.

DR. F. P. CHILLENWORTH, Hadam, Conn., has been appointed assistant professor of physiology in the University of Kansas.

At Princeton University the following new instructors and assistants have been appointed: James Waddell Alexander, Ray Edwin Gilman and Edward Staples Smith, instructors in mathematics; John Renshaw Carson, instructor in electrical engineering and physics; Keith Kuenzi Smith, instructor in physics; Percy Noyes Edwards, Charles Irving Place and Charles Hurlbut Sterrett, instructors in geodesy.

DR. HANS STILLE, professor of mineralogy and geology at Hamburg Technological School, has accepted a call to Leipzig, as the successor of Professor H. Credner, who has retired.

#### DISCUSSION AND CORRESPONDENCE

##### THE FIRST USE OF TRINIDAD PITCH FOR ROAD MAKING

THE appearance in *The Popular Science Monthly* for July and August, 1912, of Dr. Clifford Richardson's very interesting and informing article entitled "Trinidad and Bermudez Asphalts and their Use in Highway Construction," leads me to think that the publication of the following account of what is probably the earliest American use of pitch for road making may from an historical standpoint not be devoid of interest. It was found in the course of some other research in Vol. I. of R. Montgomery Martin's "History of the West Indies, comprising Jamaica, Honduras, Trinidad, etc.," which is Vol. IV. of "The British Colonial Library" by the same author. This book was published in 1836. For its use I am indebted to the kindness of Mr. Herbert Putnam, Librarian of Congress.

On page 195, at the close of his description of La Brea, the pitch lake, is found the following footnote:

I am indebted to the personal courtesy of Major General Sir Lewis Grant, late Governor of

Trinidad, for the following facts: "The pitch of the lake has been adopted for the improvement of the roads, particularly in the fertile district of Naparima, where it was brought for the purpose from La Brea. In the wet season the roads at Naparima are almost impassable in those parts where there has been no application of the pitch; but where the pitch has been applied, which is the case for several miles in North Naparima, there is a hard surface formed, which makes transport comparatively easy, both from the support afforded and from the little friction of the hardened pitch."

From the above it may be seen that pitch was used locally for road making in Trinidad some time, possibly several years, prior to 1836, the date of Martin's book. The use of pitch in Europe, so far as the present writer has been able to ascertain, but little antedates the above. Eirinus, a Greek physician, made use in 1712 of asphalt from the Val de Travers, Neuchâtel, Switzerland, as a coating for both stone and wooden walls to protect them from decay caused by insects, changes of temperature and weather. He knew of its use in Babylon as an ingredient of mortar, and seems to have used it in the same way as a lining for cisterns and as a coating for walls and floors of warehouses. However, it seems to have been first used as a road material by Count de Sassenay, who obtained his material from the same source as Eirinus and made use of it on the roads of France as early as 1832. This seems to have been rock or block asphalt. Rock asphalt was used in paving the streets of Paris in 1838, but not on a large scale until 1854. The same material was first used on the streets of London in 1869. The first pavements of this material in the United States were laid in Newark, New Jersey, in 1870. The following year saw streets in New York paved with asphalt and shortly thereafter Philadelphia followed suit. These three cities all made use of Trinidad asphalt in the rock (*i. e.*, presumably block) form. However, its use as a paving material on a large scale in the United States began with the rehabilitation of the streets of our national capitol, Washington, in 1876-77. Here both